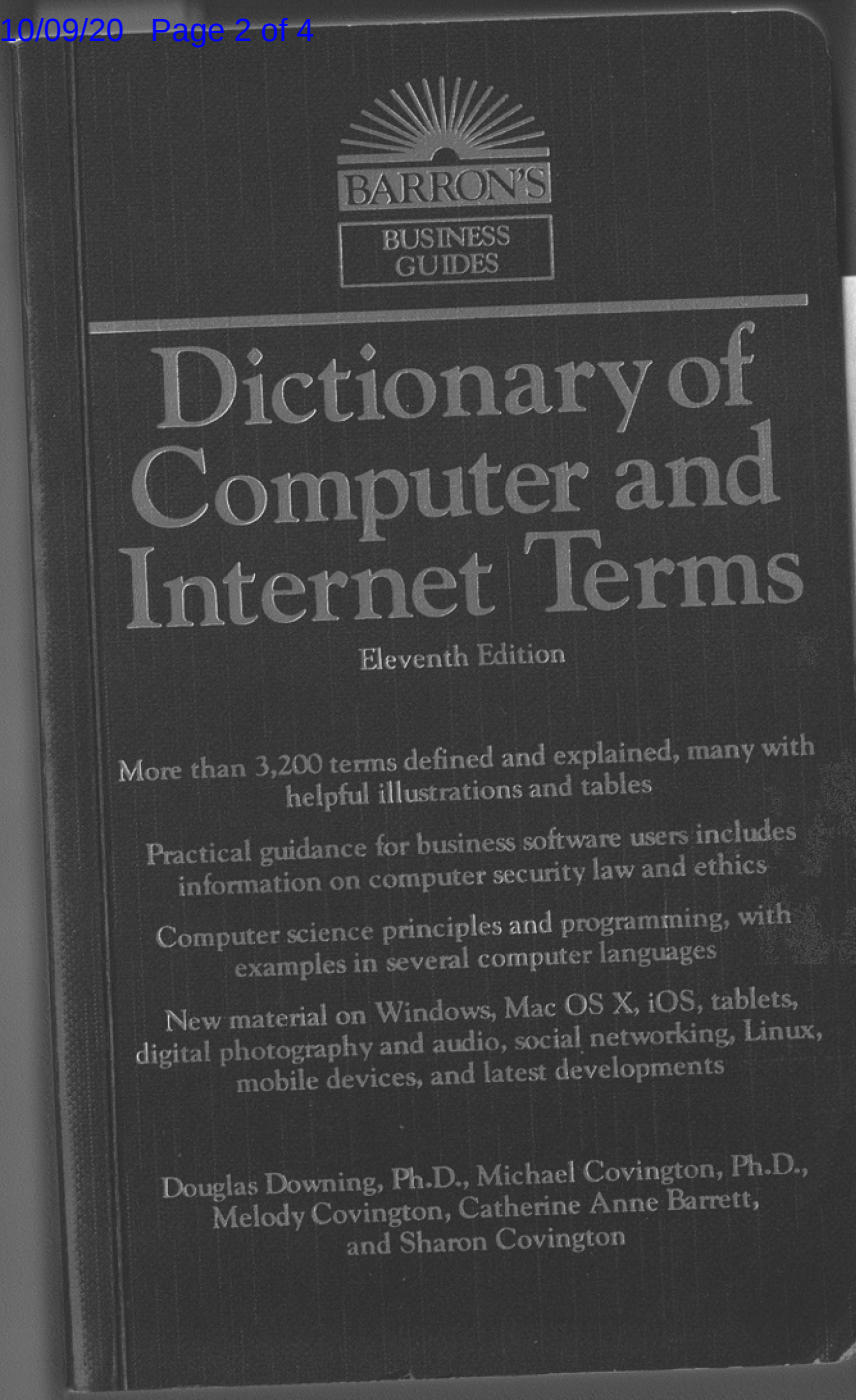
Exhibit I


BARRON'S
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Douglas Downing, Ph.D., Michael Covington, Ph.D., Melody Covington, Catherine Anne Barrett, and Sharon Covington

ABOUT THE AUTHORS

Douglas Downing teaches economics and quantitative methods at the School of Business and Economics at Seattle Pacific University. He is the author of several books in both Barron's E-Z and Business Review series. He is also the author of *Java Programming the Easy Way* and *Dictionary of Mathematics Terms*, published by Barron's Educational Series, Inc. He holds the Ph.D. degree in economics from Yale University.

Michael Covington is Associate Director of the Artificial Intelligence Institute at the University of Georgia. He is the author of several books and over 250 magazine articles. He holds the Ph.D. degree in linguistics from Yale University.

Melody Mauldin Covington is a graphic designer living in Athens, Georgia. She is the author of *Dictionary of Desktop Publishing* (published by Barron's).

Catherine Anne Barrett is a graduate of the Lamar Dodd School of Art (University of Georgia) and a student at University of Kentucky Law School.

Sharon Covington is a graduate of Emory University.

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All inquiries should be addressed to:
Barron's Educational Series, Inc.
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Hauppauge, NY 11788
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CONTENTS

- *Polynomial* or $O(n^k)$ if the number of steps is proportional to n raised to some constant power. For example, if the computation involves comparing each item of input with all of the other items, it will take n^2 steps. Many sorting algorithms are $O(n^2)$. A program that contains k nested loops, each with a number of steps proportional to n, will take time proportional to n^k.
- *Exponential* or $O(k^n)$ if the number of steps is proportional to some constant k raised to the nth power. This is what happens if the computer has to try arranging n elements in all possible sequences. Exponential-time computations are generally not practical.

There are some other possibilities; for example, Quicksort takes time proportional to $n \log n$, which is less than n^2.

In calculating complexity, we ignore factors that become insignificant as n becomes large. Suppose a computation requires $n^2 + 3n + 5$ steps. For sufficiently large n, this gets closer and closer to n^2, so we say that the complexity is $O(n^2)$.

Besides the time complexity, a computation may require constant, linear, polynomial, or exponential amounts of memory. *See also* COMPUTER SCIENCE; LIMITS OF COMPUTER POWER; QUICKSORT.

component any part of a larger system, either software or hardware. Reusable parts of programs are called software components. For examples of how software components are used, *see* ACTIVEX; COM; CORBA.

composite video the kind of video signal used in analog TV sets and still used in some types of video equipment. The whole signal is transmitted on one wire. By contrast, an RGB signal has separate wires for red, green, and blue. *See* MONITOR.

compositing the combining of bitmap images from different sources or different objects in a single image. The opacity, or ALPHA, of each object determines how it combines with objects behind it. *See also* CHROMA-KEYING.

compound a substance consisting of more than one ELEMENT; for example, a water molecule (H_2O) consists of two hydrogen atoms and one oxygen atom.

compression *see* DATA COMPRESSION.

CompuServe a pioneering online information service, which later became part of AOL.

computational linguistics the use of computers in the study of human language, and the study of how to make computers understand information expressed in human languages. *See* NATURAL LANGUAGE PROCESSING; PARSING.

computer a machine capable of executing instructions on data. The distinguishing feature of a computer is its ability to store its own instructions.

This ability makes it possible for a computer to perform many operations without the need for a person to type in new instructions each time.

Computer a link on the DESKTOP or in the START MENU of Microsoft Windows Vista and later versions that contains links to all the disk drives, the Control Panel, and other information about the system.

Ordinarily, folders are directories. The root directory of a disk drive is also a folder. "Computer" is a special folder that gives you access to the entire machine.

In previous versions of Windows, this folder was called "My Computer."

computer architecture the design and internal structure of digital computers.

Fundamentally, a computer is a machine that can store instructions and execute them. Thus, it consists of two major parts, MEMORY and the central processing unit (CPU), which communicate through a set of parallel electrical connections called the BUS (Figure 63). The bus also connects to input-output devices such as a screen, a keyboard, and disk drives.

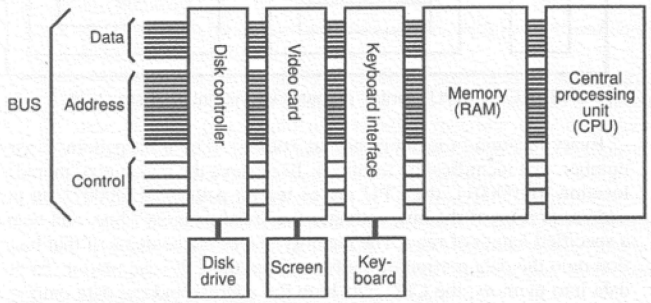

FIGURE 63. CPU communicates with memory and other devices via bus

The CPU spends its time retrieving instructions from memory and doing whatever those instructions say. Each instruction is a pattern of bits (binary ones and zeroes, represented by electrical on and off signals). When the instruction reaches the CPU, the CPU must *decode* (recognize) it and activate the appropriate *functional unit* within the CPU in order to carry out the instruction. Functional units include adders, multipliers, circuits to compare bit patterns, etc., all of which are built from logic gates (for an example, *see* BINARY ADDITION).

The CPU contains REGISTERS to hold data that is being worked on. For example, in order to add two numbers, the CPU will typically retrieve the two numbers from memory into registers, perform the addition, place the result in another register, and finally store it back into memory.